APPARATUS AND METHOD FOR REAL-TIME VOLUME PROCESSING AND UNIVERSAL 3D RENDERING

Publication number: JP2002520748 (T)

Publication date: 2002-07-09

Inventor(s):

Applicant(s):

Classification:

- international: *G06T1/20; G06T15/00;* (IPC1-7): G06T1/20; G06T15/00

- European: G06T15/00A; G06T15/08

Application number: JP20000560548T 19990716

Priority number(s): US19980092977P 19980716; WO1999US16038 19990716

Also published as:

WO0004505 (A1)
EP1114400 (A1)
EP1114400 (A4)
CA2337530 (A1)
CA2337530 (C)

more >>

Abstract not available for JP 2002520748 (T)

Abstract of corresponding document: **WO 0004505 (A1)**

An apparatus and method for real-time volume processing and universal three-dimensional rendering (10). The apparatus includes a plurality of three-dimensional memory units; at least one pixel bus for providing global horizontal communication; a plurality of rendering pipelines; at least one geometry bus; and a control unit. The plurality of rendering pipelines each preferably include hardware for interpolation, shading, FIFO buffering, communication and lookup tables. The apparatus of the present invention may be coupled to a geometry pipeline (18) for mixing surfaces, images and volumes together in a single image. A method for performing volumetric ray casting of a 3D volume includes the steps of calculating a distance along a major projection axis from a predefined viewpoint; dividing the volume into a plurality of consecutive regions having exponentially increasing bounds; casting a plurality of rays from the viewpoint through the volume; either merging two or more rays or splitting one or more rays at the region boundaries; and repeating the ray casting and merging/splitting steps until the entire volume has been processed. The apparatus and methods of the present invention achieve true real-time performance for high-resolution volume rendering, mixing surfaces and volumes in a single image operations, including texture mapping and image-based rendering.

Data supplied from the *espacenet* database — Worldwide